CURRENT STATUS OF THE CLAIMS

In the Claims

The following is a marked-up version of the claims with the language that is underlined ("___") being added and the language that contains strikethrough ("—") being deleted:

1. (Original) A method comprising the steps of:

interactively obtaining neuro-ocular wavefront data representative of anomalies in a visual system of a subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients; and

correlating the neuro-ocular wavefront data to confoundng parameters associated with the visual system of the subject, each parameter being correlated to a coefficient of the equation.

2. (Original) The method of claim 1, further comprising the step of calculating correction factors by inverting the neuro-ocular wavefront data, the correction factors corresponding to a treatment for reducing the anomalies in the visual system of the subject.

3. (Original) The method of claim 2, the correction factors corresponding to a prescription for spectacles.

4. (Original) The method of claim 2, the correction factors corresponding to a prescription for a contact lens.

5. (Original) The method of claim 2, the correction factors corresponding to a treatment profile for a refractive surgical technique.

6. (Original) The method of claim 5, the refractive surgical technique being one selected from the group consisting of:

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

7. (Original) A system comprising:

a refractometer configured to interactively obtain neuro-ocular wavefront data from a subject, the neuro-ocular wavefront data representing anomalies in a visual system of the subject, the refractometer further being configured to transmit the neuro-ocular wavefront data; and

an information storage device configured to receive the neuro-ocular wavefront data, the information storage device being located remotely from the refractometer.

8. (Original) A system comprising:

a computer configured to retrieve neuro-ocular wavefront data from an information storage device, the neuro-ocular wavefront data representing anomalies in a visual system of a subject;

a processor located within the computer, the processor being configured to calculate a correction from the neuro-ocular wavefront data, the correction corresponding to a treatment for reducing the anomalies in the visual system of the subject.

9. (Original) The system of claim 8, the correction corresponding to a prescription for spectacles.

10. (Original) The system of claim 8, the correction corresponding to a prescription for a contact lens.

11. (Original) The system of claim 8, the correction corresponding to a treatment profile for a refractive surgical technique.

12. (Original) The system of claim 11, the refractive surgical technique being one selected from the group consisting of:

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

13. (Original) A system comprising:

means for interactively obtaining neuro-ocular wavefront data from a subject, the obtained neuro-ocular wavefront data representing anomalies in the visual system of the subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients; and

means for correlating the neuro-ocular wavefront data to confounding parameters associated with the visual system of the subject, each parameter being correlated to a coefficient of the equation.

14. (Original) The system of claim 13, further comprising means for calculating correction factors by inverting the neuro-ocular wavefront data, the correction factors corresponding to a treatment for reducing the anomalies in the visual system of the subject.

15. (Original) A computer-readable medium comprising:

computer-readable code adapted to instruct a programmable device to interactively obtain neuro-ocular wavefront data from a subject, the obtained neuro-ocular wavefront data representing anomalies in the visual system of the subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients; and

computer-readable code adapted to instruct a programmable device to correlate the neuro-ocular wavefront data to parameters associated with the visual system of the subject, each parameter being correlated to a coefficient of the equation.

16. (Original) The computer-readable medium of claim 15, further comprising computer-readable code adapted to instruct a programmable device to calculate correction factors by inverting the neuro-ocular wavefront data, the correction factors corresponding to a treatment for reducing the anomalies in the visual system of the subject.

17. (Original) A method comprising the steps of:

obtaining neuro-ocular wavefront data; and

correlating the neuro-ocular wavefront data to a vision parameter of a subject.

18. (Original) The method of claim 17, the step of obtaining the neuro-ocular wavefront data comprising the steps of:

identifying visual zones, each visual zone corresponding to a different region of an eye; and

interactively obtaining information related to the visual zones.

19. (Original) The method of claim 18, the step of identifying visual zones related to the eye comprising the steps of:

identifying an area associated with an entrance pupil of the eye; and

overlaying a virtual matrix onto the identified area, each element of the matrix corresponding to one of the visual zones.

20. (Original) The method of claim 19, the virtual matrix being a predefined matrix.

21. (Original) The method of claim 19, the virtual matrix being a customized matrix.

22. (Original) The method of claim 19, the step of interactively obtaining information comprising the steps of:

projecting a reticule image at approximately the center of a pupil of an eye;

selecting a visual zone;

projecting a target image at the selected visual zone; and

querying the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

23. (Original) The method of claim 19, the step of interactively obtaining information comprising the steps of:

projecting a reticule image at approximately the location of the first Pukinje image;

selecting a visual zone;

projecting a target image at the selected visual zone; and

querying the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

24. (Original) The method of claim 19, the step of interactively obtaining information comprising the steps of:

projecting a reticule image at approximately the center of a pupil of an eye;

selecting a region on the pupil of the eye, the selected region being substantially independent of a visual zone;

projecting a target image at the selected region; and

querying the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected region.

25. (Original) The method of claim 19, the step of interactively obtaining information comprising the steps of:

projecting a reticule image at approximately the location of the first Pukinje image;

selecting a region on the pupil of the eye, the selected region being substantially independent of a visual zone;

projecting a target image at the selected region; and

querying the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected region.

26. (Original) The method of claim 19, the step of interactively obtaining information comprising the steps of:

projecting a reticule image at approximately the center of a pupil of an eye;

recursively:

selecting different visual zones;

projecting a target image at each of the different selected visual zones; and

querying the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

27. (Original) The method of claim19, the step of interactively obtaining information comprising the steps of:

projecting a reticule image at approximately the location of the first Pukinje image;

recursively:

selecting different visual zones;

projecting a target image at each of the different selected visual zones; and

querying the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

28. (Original) The method of claim 16, further comprising the step of storing the inputs from the subject for each of the different visual zones.

29. (Original) The method of claim 28, further comprising the steps of:

generating an equation from the stored inputs, the equation having coefficients, each of the coefficients representing a characteristic of the neuro-ocular wavefront data; and

calculating correction factors by inverting the equation, the correction factors being a mathematical function of the coefficients, the correction factors corresponding to a treatment for reducing the anomalies in the visual system of the subject.

30. (Original) The method of claim 29, further comprising the step of producing a simulation of a blur from the generated equation, the simulation of the blur being indicative of an actual blur seen by the subject prior to the treatment for reducing the anomalies in the visual system of the subject.

31. (Original) The method of claim 29, further comprising the step of estimating corrections for annular regions, the annular regions defining concentric areas on the pupil of the eye.

32. (Original) The method of claim 17, further comprising the step of calculating a correction factor by inverting the neuro-ocular wavefront data.

33. (Original) The method of claim 32, the correction factor representing a component of a prescription for spectacles.

34. (Original) The method of claim 32, the correction factor representing a component of a prescription for a contact lens.

35. (Original) The method of claim 32, the correction factor representing a component of a refractive surgical technique.

36. (Original) The method of claim 35, the refractive surgical technique comprising radial keratotomy (RK).

37. (Original) The method of claim 35, the refractive surgical technique comprising astigmatic keratotomy (AK).

38. (Original) The method of claim 35, the refractive surgical technique comprising automated lamellar keratoplasty (ALK).

39. (Original) The method of claim 35, the refractive surgical technique comprising photorefractive keratectomy (PRK).

40. (Original) The method of claim 35, the refractive surgical technique comprising laser in situ keratomileusis (LASIK).

41. (Original) The method of claim 35, the refractive surgical technique comprising intracorneal ring segments (Intacs).

42. (Original) The method of claim 35, the refractive surgical technique comprising laser thermal keratoplasty (LTK).

43. (Original) The method of claim 35, the refractive surgical technique comprising phakic intraocular lenses.

44. (Original) The method of claim 17, the vision parameter comprising an optical parameter.

45. (Original) The method of claim 44, the optical parameter being one selected from the group consisting of:

photopic pupil diameter;

mesopic pupil diameter;

cycloplegic pupil diameter;

near-vision preoperative refraction sphere;

near-vision preoperative refraction cylinder;

near-vision preoperative refraction axis;

far-vision preoperative refraction sphere;

far-vision preoperative refraction cylinder;

far-vision preoperative refraction axis;

near-vision postoperative refraction sphere;

near-vision postoperative refraction cylinder;

near-vision postoperative refraction axis;

far-vision postoperative refraction sphere;

far-vision postoperative refraction cylinder;

far-vision postoperative refraction axis;

left eye;

right eye;

asphericity;

axis angle;

optical zone diameter;

transition zone diameter;

central pachymetry;

spherical aberration as a percent of total root-mean-square (RMS) aberration;

coma as a percent of total RMS aberration;

trefoil as a percent of total RMS aberration;

high-order aberrations as a percent of total RMS aberration;

astigmatism index;

corneal width;

front surface corneal curvature;

back surface corneal curvature;

front-to-back alignment; and

any combination thereof.

46. (Original) The method of claim 17, the vision parameter comprising a subject parameter.

47. (Original) The method of claim 46, the subject parameter being one selected from the group consisting of:

age;

side of dominant eye;

preference between day vision and night vision;

treatment purpose;

ethnicity;

iris color;

gender; and

any combination thereof.

48. (Original) The method of claim 17, the vision parameter comprising an environmental parameter.

49. (Original) The method of claim 48, the environmental parameter being one selected from the group consisting of:

temperature;

humidity;

microkeratome used for corneal resection;

flap size;

time elapsed from opening of flap to ablation;

surgeon;

estimated total time during opening of flap;

expected flap thickness;

procedure type;

scanner used;

laser used;

day of surgery;

location of flap hinge; and

any combination thereof.

50. (Original) A system comprising:

a refractometer configured to interactively obtain neuro-ocular wavefront data from a subject; and

a processor configured to correlate the neuro-ocular wavefront data to a vision parameter associated with the subject.

51. (Original) The system of claim 50, the refractometer further being configured to identify visual zones, each visual zone corresponding to a different region of an eye, the refractometer further being configured to interactively obtain information related to the visual zones.

52. (Original) The system of claim 51, the refractometer further being configured to identify an area associated with an entrance pupil of the eye, the refractometer further being configured to overlay a virtual matrix onto the identified area, each element of the matrix corresponding to one of the visual zones.

53. (Original) The system of claim 52, the refractometer further being configured to project a reticule image at approximately the center of a pupil of an eye, the refractometer further being configured to select a visual zone, the refractometer further being configured to project a target image at the selected visual zone, the refractometer further being configured to query the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

54. (Original) The system of claim 52, the refractometer further being configured to project a reticule image at approximately the location of the first Purkinje image, the refractometer further being configured to select a visual zone, the refractometer further being configured to project a target image at the selected visual zone, the refractometer further being configured to query the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

55. (Original) The system of claim 52, the refractometer further being configured to project a reticule image at approximately the location of the first Purkinje image, the refractometer further being configured to recursively:

select different visual zones;

project a target image at each of the different selected visual zones; and

query the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

56. (Original) The system of claim 52, the refractometer further being configured to project a reticule image at approximately the center of a pupil of an eye, the refractometer further being configured to recursively:

select different visual zones;

project a target image at each of the different selected visual zones; and

query the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

57. (Original) The system of claim 56, the refractometer further being configured to store the inputs from the subject for each of the different visual zones.

58. (Original) The system of claim 57, the processor further being configured to generate an equation from the stored inputs, the equation having coefficients, each of the coefficients representing a characteristic of the neuro-ocular wavefront data, the processor further being configured to calculate correction factors by inverting the equation, the correction factors being a mathematical function of the coefficients, the correction factors corresponding to a treatment for reducing the anomalies in the visual system of the subject.

59. (Original) The system of claim 50, the processor further being configured to calculate a correction factor by inverting the neuro-ocular wavefront data.

60. (Original) The system of claim 59, the correction factor representing a component of a prescription for spectacles.

61. (Original) The system of claim 59, the correction factor representing a component of a prescription for a contact lens.

62. (Original) The system of claim 59, the correction factor representing a component of a refractive surgical technique.

63. (Original) The system of claim 62, the refractive surgical technique being one selected from the group consisting of:

comprises radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof

64. (Original) The system of claim 50, wherein the vision parameter is one selected from the group consisting of:

photopic pupil diameter;

mesopic pupil diameter;

cycloplegic pupil diameter;

near-vision preoperative refraction sphere;

near-vision preoperative refraction cylinder;

near-vision preoperative refraction axis;

far-vision preoperative refraction sphere;

far-vision preoperative refraction cylinder;

far-vision preoperative refraction axis;

near-vision postoperative refraction sphere;

near-vision postoperative refraction cylinder;

near-vision postoperative refraction axis;

far-vision postoperative refraction sphere;

far-vision postoperative refraction cylinder;

far-vision postoperative refraction axis;

left eye;

right eye;

asphericity;

axis angle;

optical zone diameter;

transition zone diameter;

central pachymetry;

spherical aberration as a percent of total root-mean-square (RMS) aberration;

coma as a percent of total RMS aberration;

trefoil as a percent of total RMS aberration;

high-order aberrations as a percent of total RMS aberration;

astigmatism index;

corneal width;

front surface corneal curvature;

back surface corneal curvature;

front-to-back alignment;

age;

side of dominant eye;

preference between day vision and night vision;

treatment purpose;

ethnicity;

iris color;

gender;

temperature;

humidity;

microkeratome used for corneal resection;

flap size;

time elapsed from opening of flap to ablation;

surgeon;

estimated total time during opening of flap;

expected flap thickness;

procedure type;

scanner used;

laser used;

day of surgery;

location of flap hinge; and

any combination thereof.

65. (Original) A system comprising:

means for obtaining neuro-ocular wavefront data from a subject; and

means for correlating the neuro-ocular wavefront data to a vision parameter of the subject.

66. (Original) The system of claim 65, further comprising:

means for identifying visual zones, each visual zone corresponding to a different region of an eye; and

means for interactively obtaining information related to the visual zones.

67. (Original) The system of claim 66, further comprising:

means for identifying an area associated with an entrance pupil of the eye; and

means for overlaying a virtual matrix onto the identified area, each element of the matrix corresponding to one of the visual zones.

68. (Original) The system of claim 67, further comprising:

means for projecting a reticule image at approximately the center of a pupil of an eye;

means for selecting a visual zone;

means for projecting a target image at the selected visual zone; and

means for querying the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

69. (Original) The system of claim 67, further comprising:

means for projecting a reticule image at approximately the location of the first Purkinje image;

means for recursively selecting different visual zones;

means for projecting a target image at each of the different selected visual zones; and

means for querying the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

70. (Original) The system of claim 67, further comprising:

means for projecting a reticule image at approximately the center of a pupil of an eye;

means for recursively selecting different visual zones;

means for projecting a target image at each of the different selected visual zones; and

means for querying the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

71. (Original) The system of claim 70, further comprising means for storing the inputs from the subject for each of the different visual zones.

72. (Original) The system of claim 71, further comprising:

means for generating an equation from the stored inputs, the equation having coefficients, each of the coefficients representing a characteristic of the neuro-ocular wavefront data; and

means for calculating correction factors by inverting the equation, the correction factors being a mathematical function of the coefficients, the correction factors corresponding to a treatment for reducing the anomalies in the visual system of the subject.

73. (Original) The system of claim 65, further comprising means for calculating a correction factor by inverting the neuro-ocular wavefront data.

74. (Original) A computer-readable medium comprising:

computer-readable code adapted to instruct a programmable device to obtain neuro-ocular wavefront data from a subject; and

computer-readable code adapted to instruct a programmable device to correlate the neuro-ocular wavefront data to a vision parameter of the subject.

75. (Original) The computer-readable medium of claim 74, further comprising:

computer-readable code adapted to instruct a programmable device to identify visual zones, each visual zone corresponding to a different region of an eye; and

computer-readable code adapted to instruct a programmable device to interactively obtain information related to the visual zones.

76. (Original) The computer-readable medium of claim 75, further comprising:

computer-readable code adapted to instruct a programmable device to identify an area associated with an entrance pupil of the eye; and

computer-readable code adapted to instruct a programmable device to overlay a virtual matrix onto the identified area, each element of the matrix corresponding to one of the visual zones.

77. (Original) The computer-readable medium of claim 76, further comprising:

computer-readable code adapted to instruct a programmable device to project a reticule image at approximately the location of the first Purkinje image;

computer-readable code adapted to instruct a programmable device to select a visual zone;

computer-readable code adapted to instruct a programmable device to project a target image at the selected visual zone; and

computer-readable code adapted to instruct a programmable device to query the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

78. (Original) The computer-readable medium of claim 76, further comprising:

computer-readable code adapted to instruct a programmable device to project a reticule image at approximately the center of a pupil of an eye;

computer-readable code adapted to instruct a programmable device to select a visual zone;

computer-readable code adapted to instruct a programmable device to project a target image at the selected visual zone; and

computer-readable code adapted to instruct a programmable device to query the subject for input, the input reflecting an alignment of the reticule image with the target image at the selected visual zone.

79. (Original) The computer-readable medium of claim 76, further comprising:

computer-readable code adapted to instruct a programmable device to project a reticule image at approximately the location of the first Purkinje image;

computer-readable code adapted to instruct a programmable device to recursively select different visual zones;

computer-readable code adapted to instruct a programmable device to project a target image at each of the different selected visual zones; and

computer-readable code adapted to instruct a programmable device to query the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

80. (Original) The computer-readable medium of claim 76, further comprising:

computer-readable code adapted to instruct a programmable device to project a reticule image at approximately the center of a pupil of an eye;

computer-readable code adapted to instruct a programmable device to recursively select different visual zones;

computer-readable code adapted to instruct a programmable device to project a target image at each of the different selected visual zones; and

computer-readable code adapted to instruct a programmable device to query the subject for input, the input reflecting an alignment of the reticule image with the target image at each of the different visual zones.

81. (Original) The computer-readable medium of claim 80, further comprising computer-readable code adapted to instruct a programmable device to store the inputs from the subject for each of the different visual zones.

82. (Original) The computer-readable medium of claim 81, further comprising

computer-readable code adapted to instruct a programmable device to generate an equation from the stored inputs, the equation having coefficients, each of the coefficients representing a characteristic of the neuro-ocular wavefront data; and

computer-readable code adapted to instruct a programmable device to calculate correction factors by inverting the equation, the correction factors being a mathematical function of the coefficients, the correction factors corresponding to a treatment for reducing the anomalies in the vision system of the subject.

83. (Original) The computer-readable medium of claim 74, further comprising computer-readable code adapted to instruct a programmable device to calculate a correction factor by inverting the neuro-ocular wavefront data.

84. (Original) A method comprising the steps of:

interactively obtaining preoperative neuro-ocular wavefront data from a subject, the preoperative neuro-ocular wavefront data representing anomalies in the visual system of the subject, the preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

determining a correction for reducing the anomalies in the visual system of the subject, the correction being a function of the preoperative neuro-ocular wavefront data;

predicting a result of applying the determined correction;

interactively obtaining postoperative neuro-ocular wavefront data for the subject, the postoperative neuro-ocular wavefront data representing a corrected visual system of the subject, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients; and

determining a deviation between the predicted result and the postoperative neuro-ocular wavefront data.

85. (Original) The method of claim 84, further comprising the step of calculating a future correction, the future correction being a function of the determined deviation between the predicted result and the postoperative neuro-ocular wavefront data.

86. (Original) The method of claim 84, the correction comprising a prescription for spectacles.

87. (Original) The method of claim 84, the correction comprising a prescription for a contact lens.

88. (Original) The method of claim 84, the correction comprising a treatment profile for a refractive surgical technique.

89. (Original) The method of claim 88, the refractive surgical technique being one selected from the group consisting of:

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

90. (Original) A system comprising:

a refractometer configured to interactively obtain preoperative neuro-ocular wavefront data from a subject, the preoperative neuro-ocular wavefront data representing anomalies in the visual system of the subject, the preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients, the refractometer further being configured to interactively obtain postoperative neuro-ocular wavefront data for the subject, the postoperative neuro-ocular wavefront data representing a corrected visual system of the subject, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients; and

a processor configured to determine a correction for reducing the anomalies in the visual system of the subject, the correction being a function of the preoperative neuro-ocular wavefront data, the processor further being configured to predict a result of applying the determined correction, the processor further being configured to determine a deviation between the predicted result and the postoperative neuro-ocular wavefront data.

91. (Original) The system of claim 90, the processor being an integrated component of the refractometer.

92. (Original) The system of claim 90, the processor being located remotely from the refractometer.

93. (Original) The system of claim 90, the processor further being configured to calculate a future correction, the future correction being a function of the determined deviation between the predicted result and the postoperative neuro-ocular wavefront data.

94. (Original) The system of claim 90, the correction comprising a prescription for spectacles.

95. (Original) The system of claim 90, the correction comprising a prescription for a contact lens.

96. (Original) The system of claim 90, the correction comprising a treatment profile for a refractive surgical technique.

97. (Original) The system of claim 96, the refractive surgical technique being one selected from the group consisting of:

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

98. (Original) A system comprising:

means for interactively obtaining preoperative neuro-ocular wavefront data from a subject, the preoperative neuro-ocular wavefront data representing anomalies in the visual system of the subject, the preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

means for determining a correction for reducing the anomalies in the visual system of the subject, the correction being a function of the preoperative neuro-ocular wavefront data;

means for predicting a result of applying the determined correction;

means for interactively obtaining postoperative neuro-ocular wavefront data for the subject, the postoperative neuro-ocular wavefront data representing a corrected visual system of the subject, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients; and

means for determining a deviation between the predicted result and the postoperative neuro-ocular wavefront data.

99. (Original) The method of claim 98, further comprising means for calculating a future correction, the future correction being a function of the determined deviation between the predicted result and the postoperative neuro-ocular wavefront data.

100. (Original) A computer-readable medium comprising:

computer-readable code adapted to instruct a programmable device to interactively obtain preoperative neuro-ocular wavefront data from a subject, the preoperative neuro-ocular wavefront data representing anomalies in the visual system of the subject, the preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

computer-readable code adapted to instruct a programmable device to determine a correction for reducing the anomalies in the visual system of the subject, the correction being a function of the preoperative neuro-ocular wavefront data;

computer-readable code adapted to instruct a programmable device to predict a result of applying the determined correction;

computer-readable code adapted to instruct a programmable device to interactively obtain postoperative neuro-ocular wavefront data for the subject, the postoperative neuro-ocular wavefront data representing a corrected visual system of the subject, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients; and

computer-readable code adapted to instruct a programmable device to determine a deviation between the predicted result and the postoperative neuro-ocular wavefront data.

101. (Original) The method of claim 100, further comprising computer-readable code adapted to instruct a programmable device to calculate a future correction, the future correction being a function of the determined deviation between the predicted result and the postoperative neuro-ocular wavefront data.

102. (Original) A method comprising the steps of:

interactively obtaining multiple sets of neuro-ocular wavefront data, each neuro-ocular wavefront data representing anomalies in the visual system of a corresponding subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients;

storing the multiple sets of neuro-ocular wavefront data at a central repository; and

statistically analyzing the multiple sets of neuro-ocular wavefront data.

103. (Original) The method of claim 102, the step of statistically analyzing the multiple sets of neuro-ocular wavefront data comprising the step of applying a statistical regression across the multiple sets of neuro-ocular wavefront data.

104. (Original) The method of claim 103, further comprising the step of determining parameters in an algorithm, the algorithm being configured to calculate a correction for anomalies in a visual system of a subject.

105. (Original) The method of claim 102, the multiple sets of neuro-ocular wavefront data comprising:

a first set of preoperative neuro-ocular wavefront data for a first subject, the first set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the first subject, the first set of preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

a first set of postoperative neuro-ocular wavefront data for the first subject, the first set of postoperative neuro-ocular wavefront data representing a corrected visual system of the first subject, the visual system of the first subject being corrected by a first treatment, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients;

a second set of preoperative neuro-ocular wavefront data for a second subject, the second set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the second subject, the anomalies in the visual system of the second subject being substantially similar to the anomalies in the visual system of the first subject, the second set of preoperative neuro-ocular wavefront data being represented by a third equation, the third equation having a third set of coefficients; and

a second set of postoperative neuro-ocular wavefront data for the second subject, the second set of postoperative neuro-ocular wavefront data representing a corrected visual system of the second subject, the visual system of the second subject being corrected by a second treatment, the second treatment being substantially different from the first treatment, the postoperative neuro-ocular wavefront data being represented by a fourth equation, the fourth equation having a fourth set of coefficients.

106. (Original) The method of claim 105, the first treatment being one selected from the group consisting of:

a prescription for spectacles;

a prescription for a contact lens;

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

107. (Original) The method of claim 105, the second treatment being one selected from the group consisting of:

a prescription for spectacles;

a prescription for a contact lens;

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

108. (Original) The method of claim 102, the multiple sets of neuro-ocular wavefront data comprising:

a first set of preoperative neuro-ocular wavefront data for a first subject, the first set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the first subject, the first set of preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

a first set of postoperative neuro-ocular wavefront data for the first subject, the first set of postoperative neuro-ocular wavefront data representing a corrected visual system of the first subject, the visual system of the first subject being corrected by a first treatment, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients;

a second set of preoperative neuro-ocular wavefront data for a second subject, the second set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the second subject, the anomalies in the visual system of the second subject being substantially similar to the anomalies in the visual system of the first subject, the second set of preoperative neuro-ocular wavefront data being represented by a third equation, the third equation having a third set of coefficients; and

a second set of postoperative neuro-ocular wavefront data for the second subject, the second set of postoperative neuro-ocular wavefront data representing a corrected visual system of the second subject, the visual system of the second subject being corrected by a second treatment, the second treatment being substantially similar to the first treatment, the postoperative neuro-ocular wavefront data being represented by a fourth equation, the fourth equation having a fourth set of coefficients.

109. (Original) The method of claim 108, the first treatment being one selected from the group consisting of:

a prescription for spectacles;

a prescription for a contact lens;

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

110. (Original) The method of claim 108, the second treatment being one selected from the group consisting of:

a prescription for spectacles;

a prescription for a contact lens;

radial keratotomy (RK);

astigmatic keratotomy (AK);

automated lamellar keratoplasty (ALK);

photorefractive keratectomy (PRK);

laser in situ keratomileusis (LASIK);

intracorneal ring segments (Intacs);

intracornea lens surgery;

laser thermal keratoplasty (LTK);

phakic intraocular lenses; and

any combination thereof.

111. (Original) The method of claim 102, the multiple sets of neuro-ocular wavefront data comprising:

a first set of preoperative neuro-ocular wavefront data for a first subject, the first set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the first subject, the first set of preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

a first set of postoperative neuro-ocular wavefront data for the first subject, the first set of postoperative neuro-ocular wavefront data representing a corrected visual system of the first subject, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients;

a second set of preoperative neuro-ocular wavefront data for a second subject, the second set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the second subject, the second set of preoperative neuro-ocular wavefront data being represented by a third equation, the third equation having a third set of coefficients; and

a second set of postoperative neuro-ocular wavefront data for the second subject, the second set of postoperative neuro-ocular wavefront data representing a corrected visual system of the second subject, the postoperative neuro-ocular wavefront data being represented by a fourth equation, the fourth equation having a fourth set of coefficients.

112. (Original) The method of claim 111, the step of statistically analyzing the multiple sets of neuro-ocular wavefront data comprising the steps of:

determining a first correction for reducing the anomalies in the visual system of the first subject, the first correction being a function of the first preoperative neuro-ocular wavefront data;

predicting a first result of applying the first correction;

determining a first deviation between the predicted first result and the first set of postoperative neuro-ocular wavefront data;

determining a second correction for reducing the anomalies in the visual system of the second subject, the second correction being a function of the second preoperative neuro-ocular wavefront data;

predicting a second result of applying the second correction; and

determining a second deviation between the predicted second result and the second set of postoperative neuro-ocular wavefront data; and

comparing the first deviation with the second deviation.

113. (Original) The method of claim 112, the step of determining the first deviation comprising the step of identifying a mismatch between the first equation and the second equation, the step of determining the second deviation comprising the step of identifying a mismatch between the third equation and the fourth equation.

114. (Original) The method of claim 113, each of the equations representing a vision parameter, the vision parameter being selected from the group consisting of:

photopic pupil diameter;

mesopic pupil diameter;

cycloplegic pupil diameter;

near-vision preoperative refraction sphere;

near-vision preoperative refraction cylinder;

near-vision preoperative refraction axis;

far-vision preoperative refraction sphere;

far-vision preoperative refraction cylinder;

far-vision preoperative refraction axis;

near-vision postoperative refraction sphere;

near-vision postoperative refraction cylinder;

near-vision postoperative refraction axis;

far-vision postoperative refraction sphere;

far-vision postoperative refraction cylinder;

far-vision postoperative refraction axis;

left eye;

right eye;

asphericity;

axis angle;

optical zone diameter;

transition zone diameter;

central pachymetry;

spherical aberration as a percent of total root-mean-square (RMS) aberration;

coma as a percent of total RMS aberration;

trefoil as a percent of total RMS aberration;

high-order aberrations as a percent of total RMS aberration;

astigmatism index;

corneal width;

front surface corneal curvature;

back surface corneal curvature;

front-to-back alignment;

age;

side of dominant eye;

preference between day vision and night vision;

treatment purpose;

ethnicity;

iris color;

gender;

temperature;

humidity;

microkeratome used for corneal resection;

flap size;

time elapsed from opening of flap to ablation;

surgeon;

estimated total time during opening of flap;

expected flap thickness;

procedure type;

scanner used;

laser used;

day of surgery;

location of flap hinge; and

any combination thereof.

115. (Original) A system comprising:

a refractometer configured to interactively obtain multiple sets of neuro-ocular wavefront data, each neuro-ocular wavefront data representing anomalies in the visual system of a corresponding subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients;

an information storage device configured to store the multiple sets of neuro-ocular wavefront data at a central repository; and

a processor configured to statistically analyzing the multiple sets of neuro-ocular wavefront data.

116. (Original) The system of claim 115, the processor being integrated with the refractometer.

117. (Original) The system of claim 115, the processor being located remotely from the refractometer.

118. (Original) The system of claim 115, the information storage device being integrated with the refractometer.

119. (Original) The system of claim 115, the information storage device being located remotely from the refractometer.

120. (Original) The system of claim 115, the processor further being configured to apply a statistical regression across the multiple sets of neuro-ocular wavefront data, the processor further being configured to determine parameters in an algorithm, the algorithm being configured to calculate a correction for anomalies in a visual system of a subject.

121. (Original) The system of claim 115, the multiple sets of neuro-ocular wavefront data comprising:

a first set of preoperative neuro-ocular wavefront data for a first subject, the first set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the first subject, the first set of preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

a first set of postoperative neuro-ocular wavefront data for the first subject, the first set of postoperative neuro-ocular wavefront data representing a corrected visual system of the first subject, the visual system of the first subject being corrected by a first treatment, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients;

a second set of preoperative neuro-ocular wavefront data for a second subject, the second set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the second subject, the anomalies in the visual system of the second subject being substantially similar to the anomalies in the visual system of the first subject, the second set of preoperative neuro-ocular wavefront data being represented by a third equation, the third equation having a third set of coefficients; and

a second set of postoperative neuro-ocular wavefront data for the second subject, the second set of postoperative neuro-ocular wavefront data representing a corrected visual system of the second subject, the visual system of the second subject being corrected by a second treatment, the second treatment being substantially different from the first treatment, the postoperative neuro-ocular wavefront data being represented by a fourth equation, the fourth equation having a fourth set of coefficients.

122. (Original) The system of claim 115, the multiple sets of neuro-ocular wavefront data comprising:

a first set of preoperative neuro-ocular wavefront data for a first subject, the first set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the first subject, the first set of preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

a first set of postoperative neuro-ocular wavefront data for the first subject, the first set of postoperative neuro-ocular wavefront data representing a corrected visual system of the first subject, the visual system of the first subject being corrected by a first treatment, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients;

a second set of preoperative neuro-ocular wavefront data for a second subject, the second set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the second subject, the anomalies in the visual system of the second subject being substantially similar to the anomalies in the visual system of the first subject, the second set of preoperative neuro-ocular wavefront data being represented by a third equation, the third equation having a third set of coefficients; and

a second set of postoperative neuro-ocular wavefront data for the second subject, the second set of postoperative neuro-ocular wavefront data representing a corrected visual system of the second subject, the visual system of the second subject being corrected by a second treatment, the second treatment being substantially similar to the first treatment, the postoperative neuro-ocular wavefront data being represented by a fourth equation, the fourth equation having a fourth set of coefficients.

123. (Original) The system of claim 115, the multiple sets of neuro-ocular wavefront data comprising:

a first set of preoperative neuro-ocular wavefront data for a first subject, the first set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the first subject, the first set of preoperative neuro-ocular wavefront data being represented by a first equation, the first equation having a first set of coefficients;

a first set of postoperative neuro-ocular wavefront data for the first subject, the first set of postoperative neuro-ocular wavefront data representing a corrected visual system of the first subject, the postoperative neuro-ocular wavefront data being represented by a second equation, the second equation having a second set of coefficients;

a second set of preoperative neuro-ocular wavefront data for a second subject, the second set of preoperative neuro-ocular wavefront data representing anomalies in the visual system of the second subject, the second set of preoperative neuro-ocular wavefront data being represented by a third equation, the third equation having a third set of coefficients; and

a second set of postoperative neuro-ocular wavefront data for the second subject, the second set of postoperative neuro-ocular wavefront data representing a corrected visual system of the second subject, the postoperative neuro-ocular wavefront data being represented by a fourth equation, the fourth equation having a fourth set of coefficients.

124. (Original) The system of claim 123, the processor further being configured to determine a first correction for reducing the anomalies in the visual system of the first subject, the first correction being a function of the first preoperative neuro-ocular wavefront data, the processor further being configured to predict a first result of applying the first correction, the processor further being configured to determine a first deviation between the predicted first result and the first set of postoperative neuro-ocular wavefront data, the processor further being configured to determine a second correction for reducing the anomalies in the visual system of the second subject, the second correction being a function of the second preoperative neuro-ocular wavefront data, the processor further being configured to predict a second result of applying the second correction, the processor further being configured to determine a second deviation between the predicted second result and the second set of postoperative neuro-ocular wavefront data, the processor further being configured to compare the first deviation with the second deviation.

125. (Original) The system of claim 124, the processor further being configured to identify a mismatch between the first equation and the second equation, processor further being configured to identify a mismatch between the third equation and the fourth equation.

126. (Original) A system comprising:

means for interactively obtaining multiple sets of neuro-ocular wavefront data, each neuro-ocular wavefront data representing anomalies in the visual system of a corresponding subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients;

means for storing the multiple sets of neuro-ocular wavefront data at a central repository; and

means for statistically analyzing the multiple sets of neuro-ocular wavefront data.

127. (Original) A computer-readable medium comprising:

computer-readable code adapted to instruct a programmable device to interactively obtain multiple sets of neuro-ocular wavefront data, each neuro-ocular wavefront data representing anomalies in the visual system of a corresponding subject, the neuro-ocular wavefront data being represented by an equation, the equation having coefficients;

computer-readable code adapted to instruct a programmable device to store the multiple sets of neuro-ocular wavefront data at a central repository; and

computer-readable code adapted to instruct a programmable device to statistically analyze the multiple sets of neuro-ocular wavefront data.

128. (Original) A method comprising the steps of:

obtaining neuro-ocular wavefront data; and

ascertaining characteristics of a visual system from the obtained neuro-ocular wavefront data..

129. (Original) The method of claim 128, further comprising the step of correlating the characteristics of the visual system with vision parameters.

130. (Original) A system comprising:

means for obtaining neuro-ocular wavefront data; and

means for ascertaining characteristics of a visual system from the obtained neuro-ocular wavefront data..

131. (Original) The system of claim 130, further comprising means for correlating the characteristics of the visual system with vision parameters.

132. (Original) A system comprising:

a refractometer configured to obtain neuro-ocular wavefront data; and

a processor configured to ascertain characteristics of a visual system from the obtained neuro-ocular wavefront data..

133. (Original) The system of claim 132, the processor further being configured to correlate the characteristics of the visual system with vision parameters.

134. (Original) A computer-readable medium comprising:

computer-readable code adapted to instruct a programmable device to obtain neuro-ocular wavefront data; and

computer-readable code adapted to instruct a programmable device to ascertain characteristics of a visual computer-readable medium from the obtained neuro-ocular wavefront data.

135. (Original) The computer-readable medium of claim 134, further comprising computer-readable code adapted to instruct a programmable device to correlate the characteristics of the visual system with vision parameters.